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DEC 27 2005
PATENT & TRADEMARK OFFICE

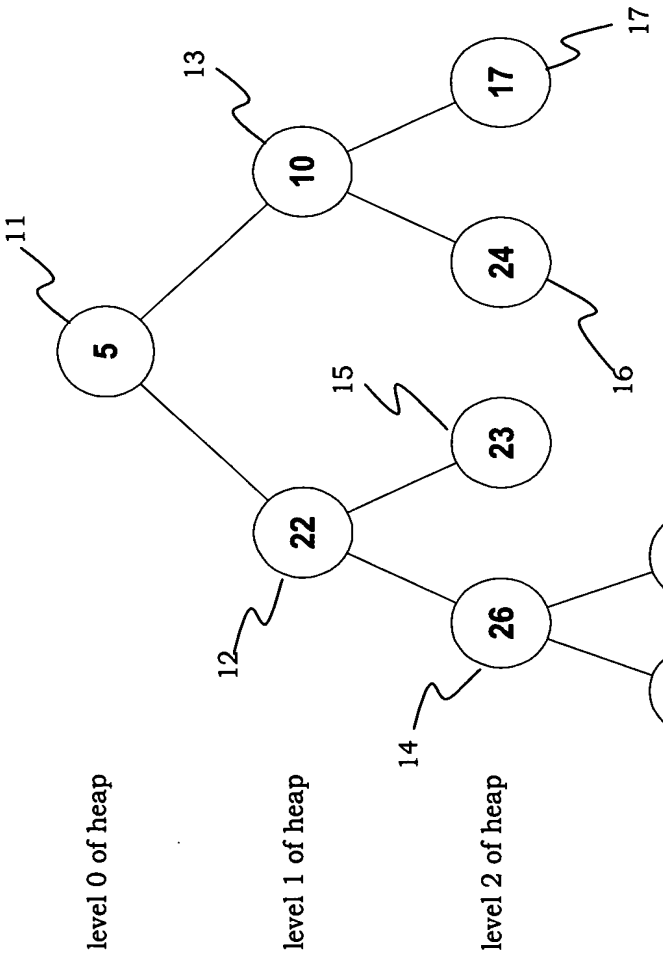


FIGURE 1
(Prior Art)

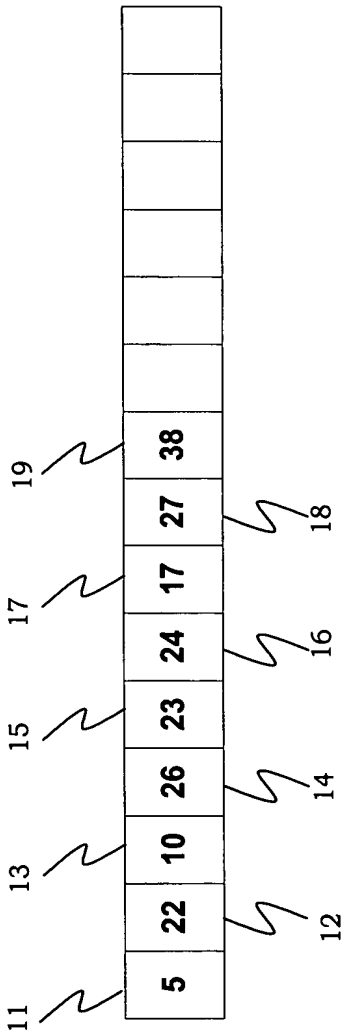


FIGURE 2
(Prior Art)

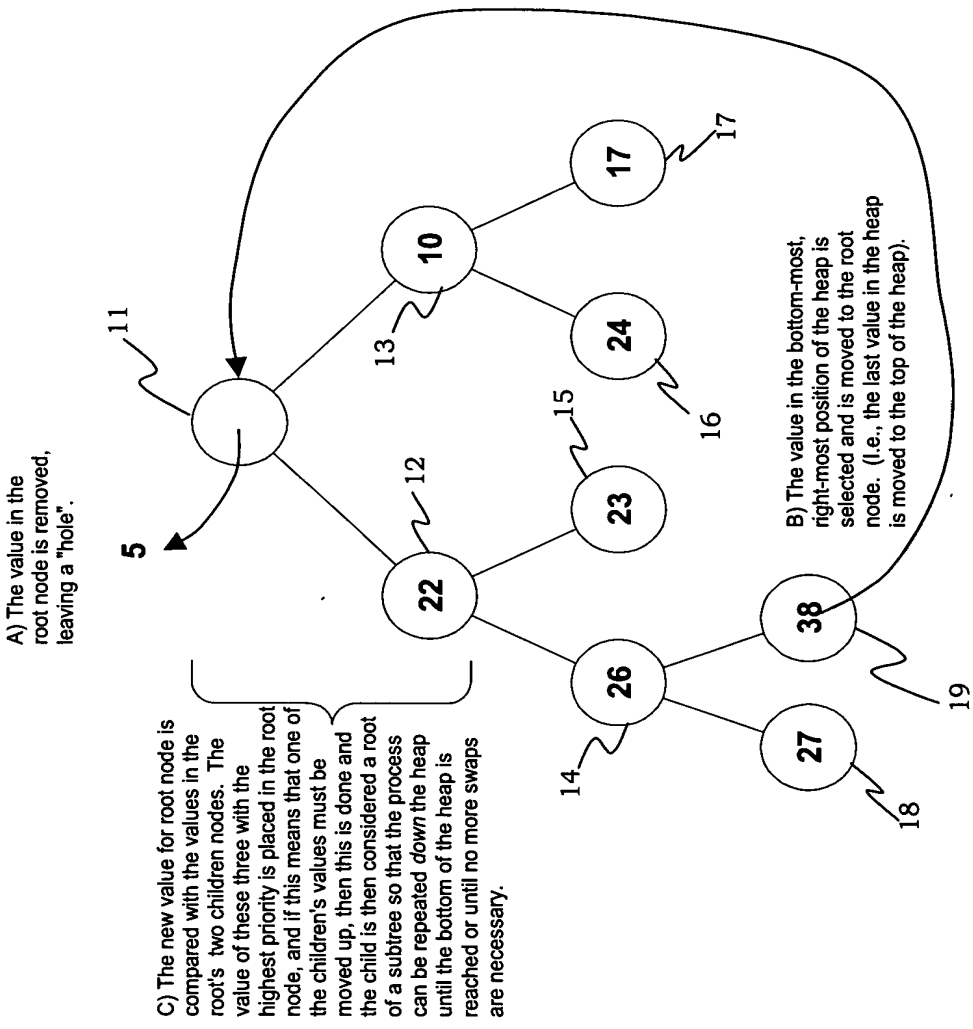


FIGURE 3
(Prior Art)

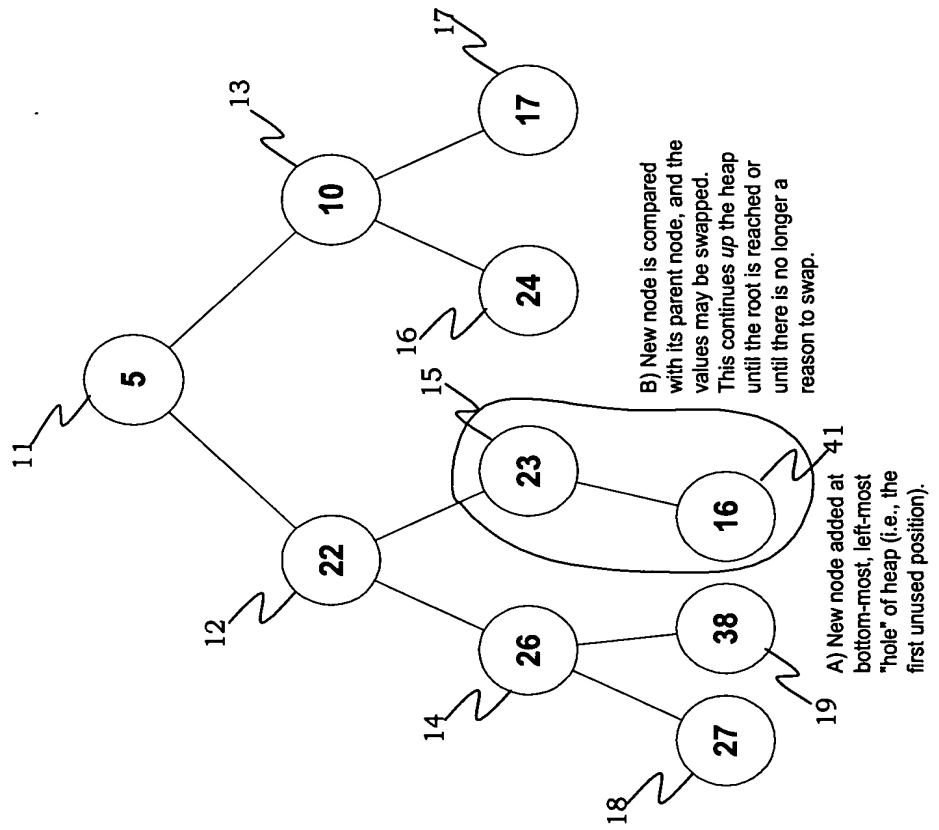


FIGURE 4
(Prior Art)

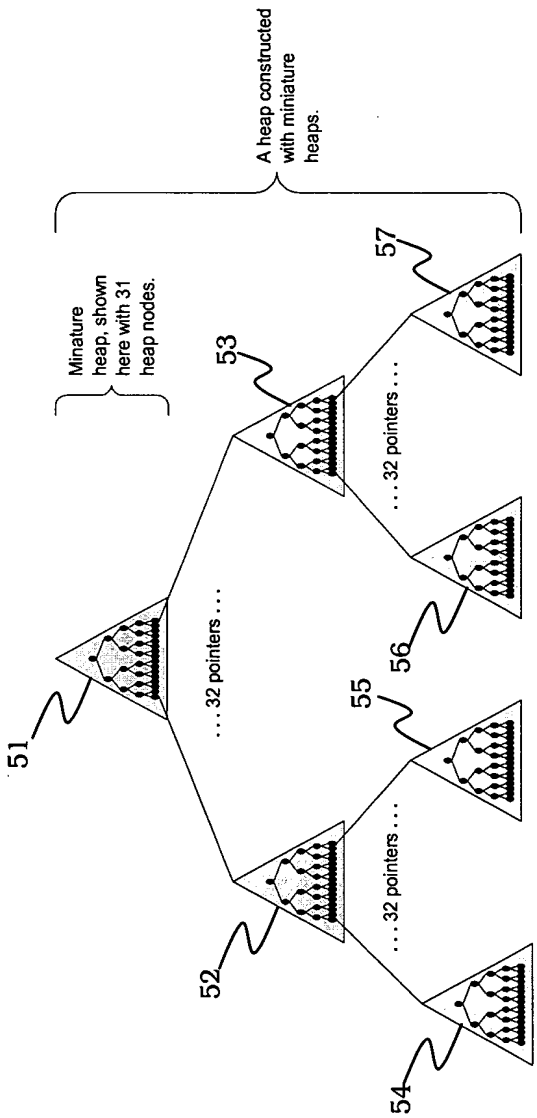

A heap constructed with miniature heaps.
Minature heap, shown here with 31 heap nodes.
51
52
53
54
55
56
57
....32 pointers....
....32 pointers....
....32 pointers....
50

FIGURE 5

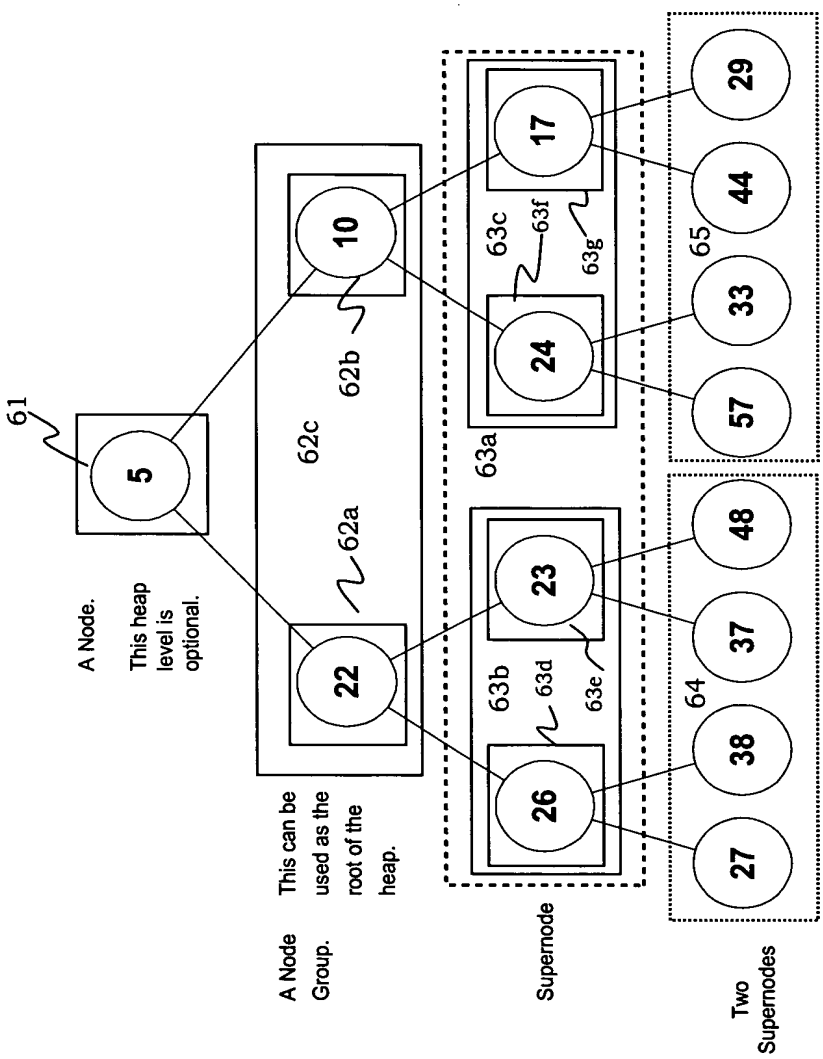
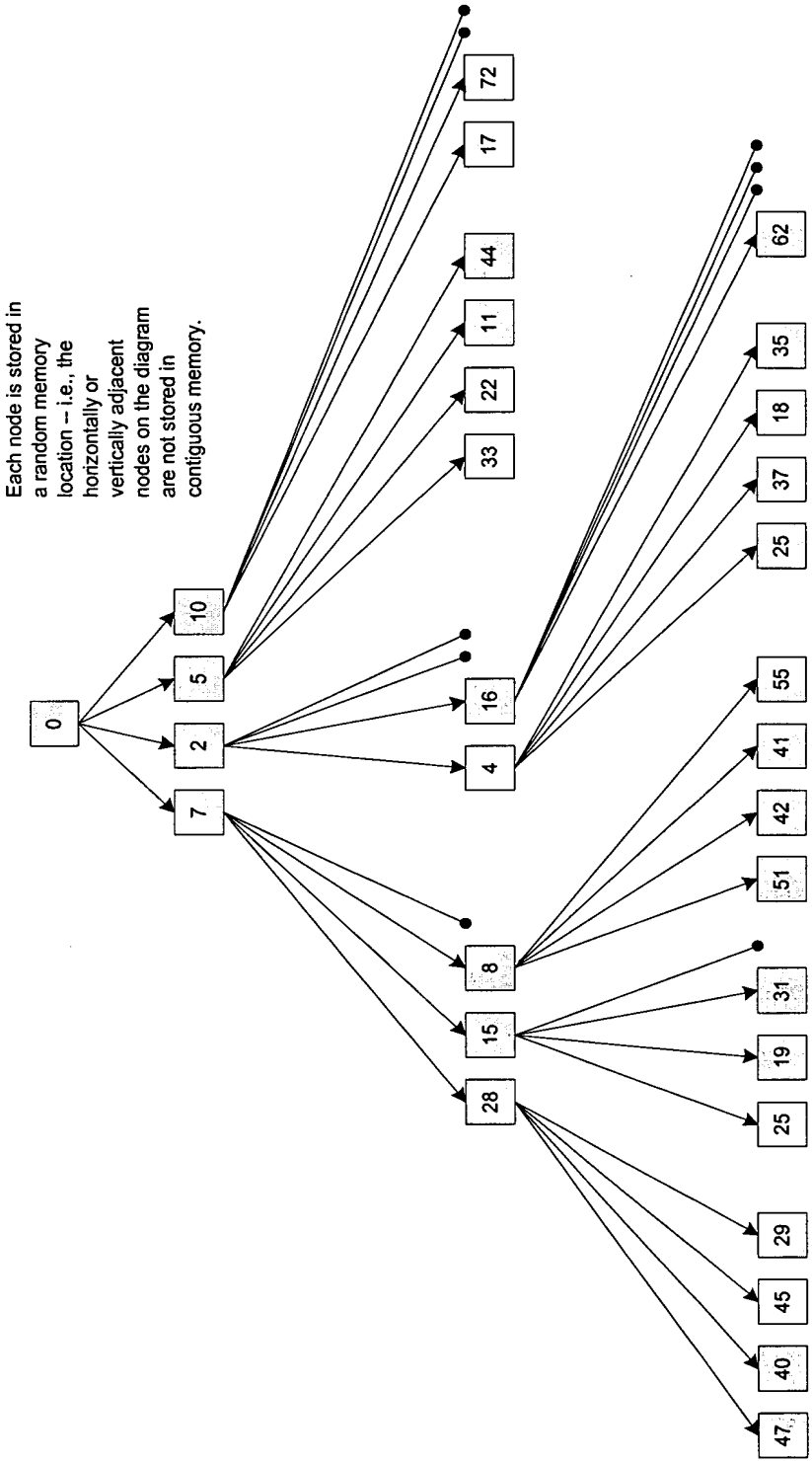

61
5
A Node.
This heap level is optional.
62c
62b
62a
10
22
23
26
63a
63b
63c
63d
63e
63f
63g
24
17
64
65
27
38
37
48
57
33
44
29
This can be used as the root of the heap.
A Node Group.
Supernode
Two Supernodes
60

FIGURE 6


Each node is stored in a random memory location -- i.e., the horizontally or vertically adjacent nodes on the diagram are not stored in contiguous memory.
0
10
5
2
7
72
17
44
11
22
33
16
4
62
35
18
37
25
8
15
28
55
41
42
51
31
19
25
29
45
40
47

70

FIGURE 7

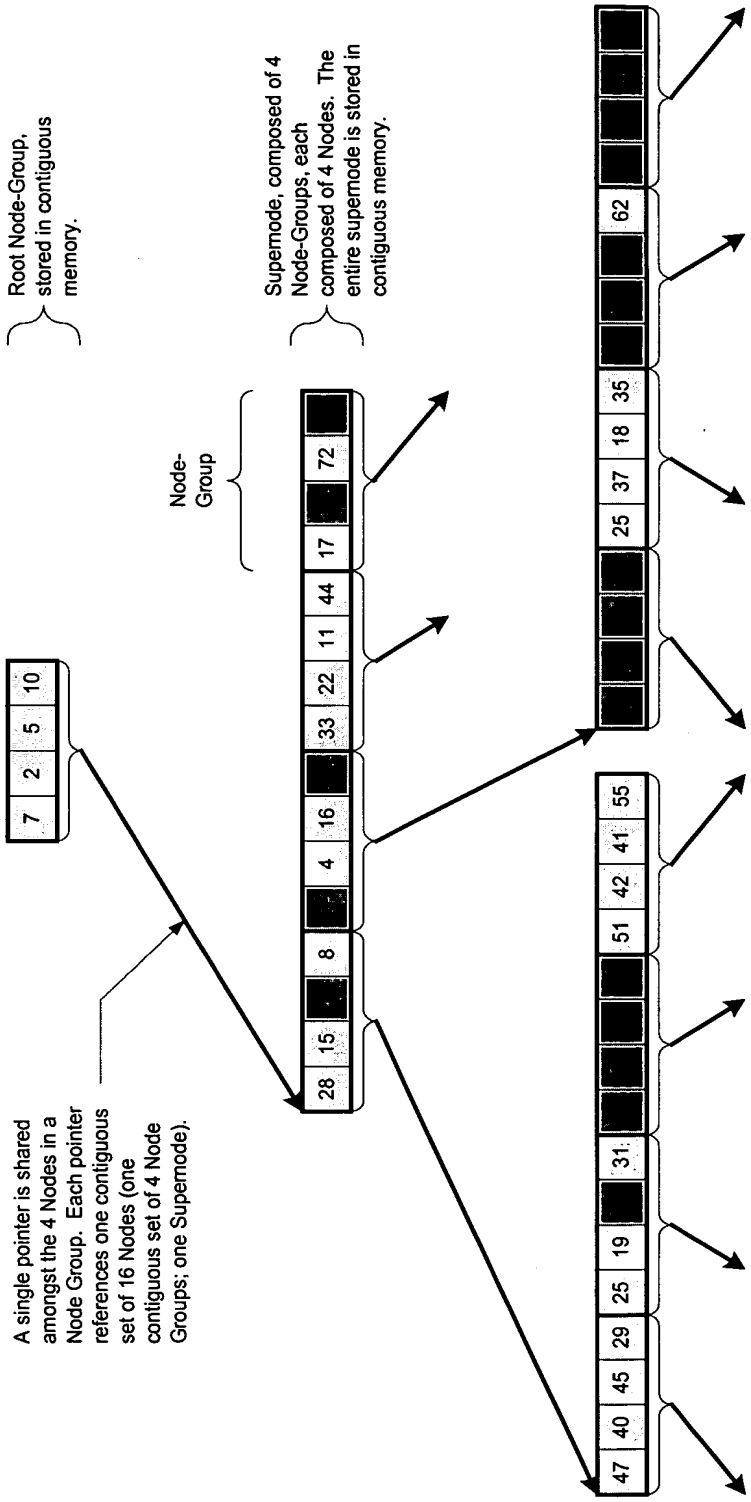

Root Node-Group, stored in contiguous memory.
Supernode, composed of 4 Node-Groups, each composed of 4 Nodes. The entire supernode is stored in contiguous memory.
Node-Group
A single pointer is shared amongst the 4 Nodes in a Node Group. Each pointer references one contiguous set of 16 Nodes (one contiguous set of 4 Node Groups; one Supernode).
7 2 5 10
28 15 8 4 16 33 22 11 44 17 72
25 37 18 35 62
47 40 45 29 25 19 31 51 42 41 55
80

FIGURE 8

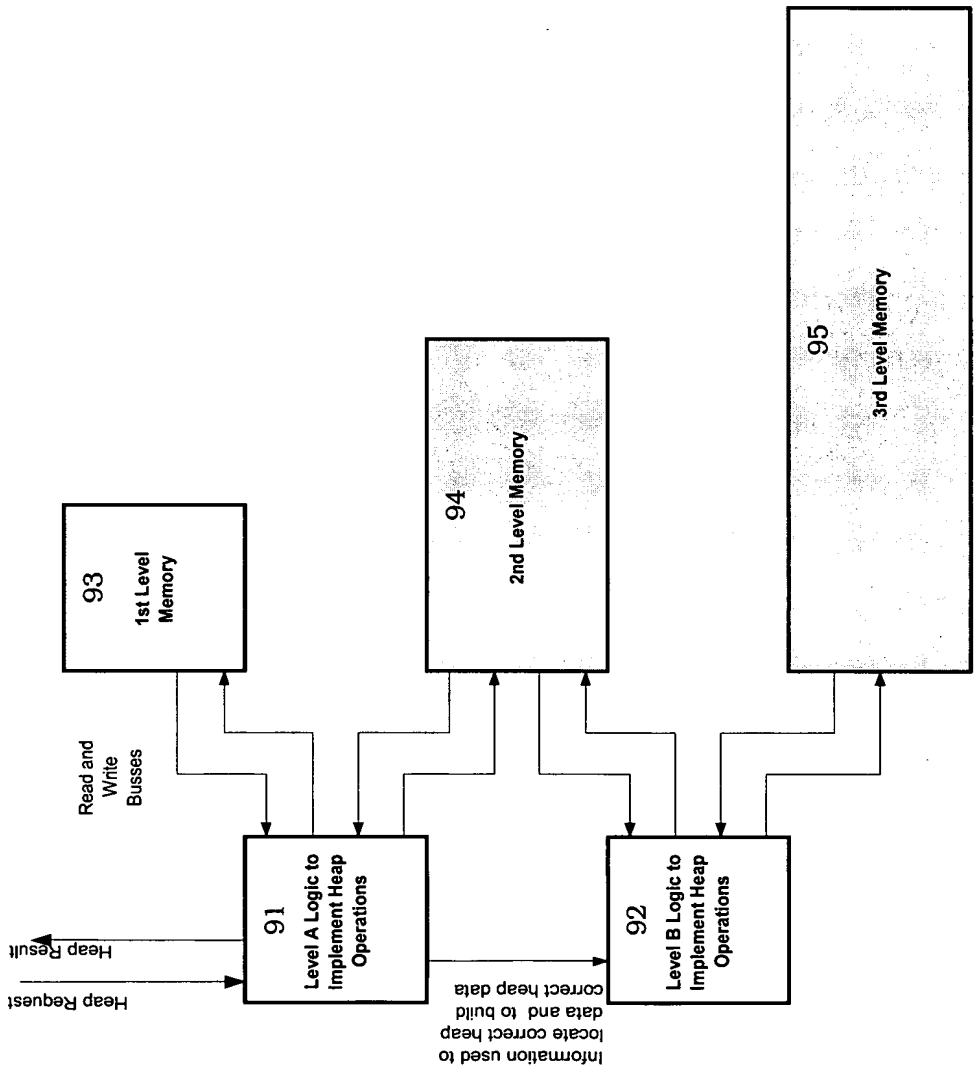

93
1st Level Memory
94
2nd Level Memory
95
3rd Level Memory
Read and Write Busses
91
Level A Logic to Implement Heap Operations
92
Level B Logic to Implement Heap Operations
Heap Request
Heap Result
Information used to locate correct heap data and to build correct heap data
90

FIGURE 9

	time ---------->																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Read Level 1 RAM	A						B											
Write Level 1 RAM						A						B						
Level A Comparisons				A	A					B	B							
Read Level 2 RAM			A						B									
Write Level 2 RAM								A						B				
Level B Comparisons					A	A						B	B					
Read Level 3 RAM					A						B							
Write Level 3 RAM										A						B		
Level C Comparisons								A	A					B	B			
Read Level 4 RAM							A						B					
Write Level 4 RAM										A						B		

100

FIGURE 10

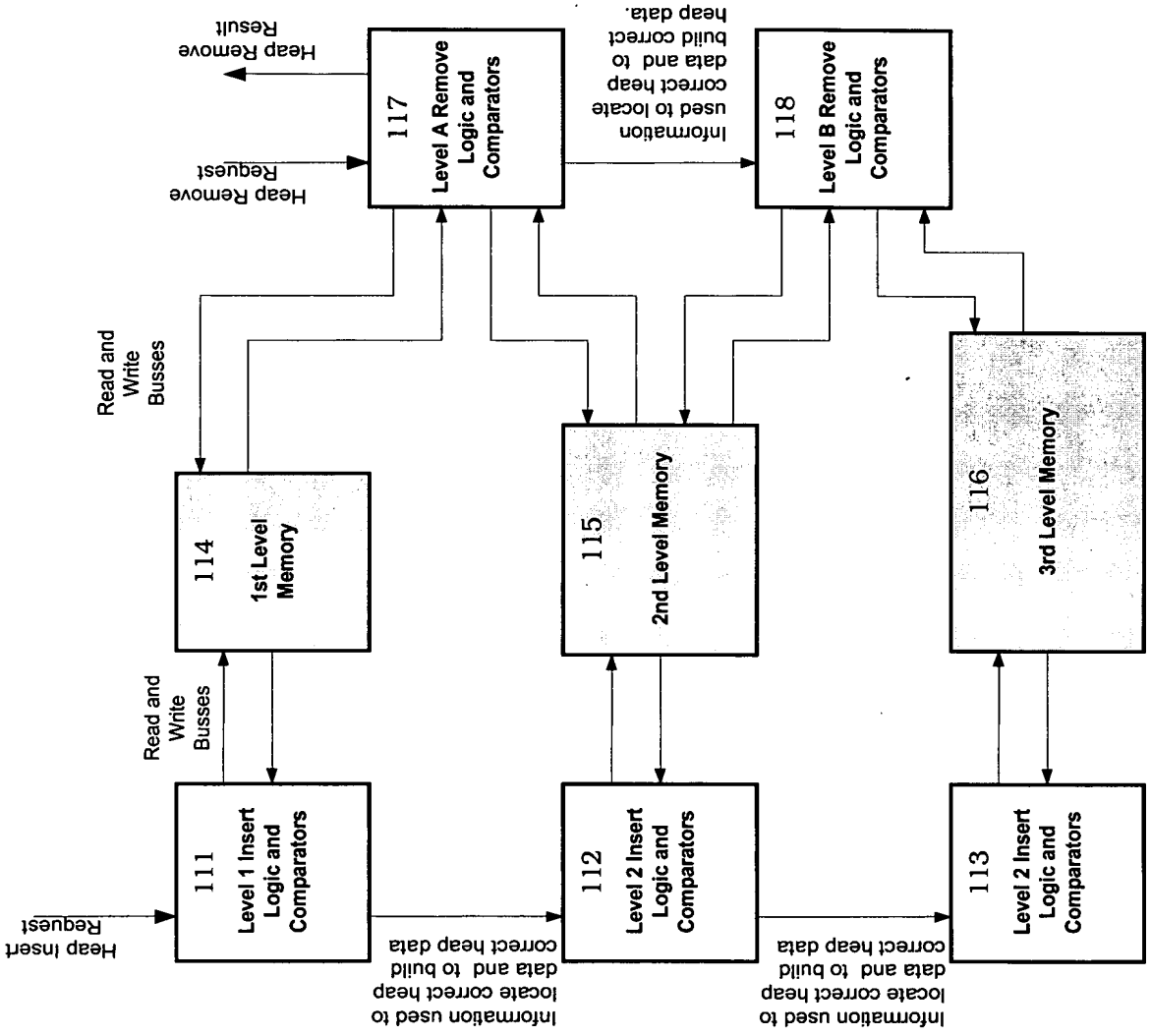


FIGURE 11

110

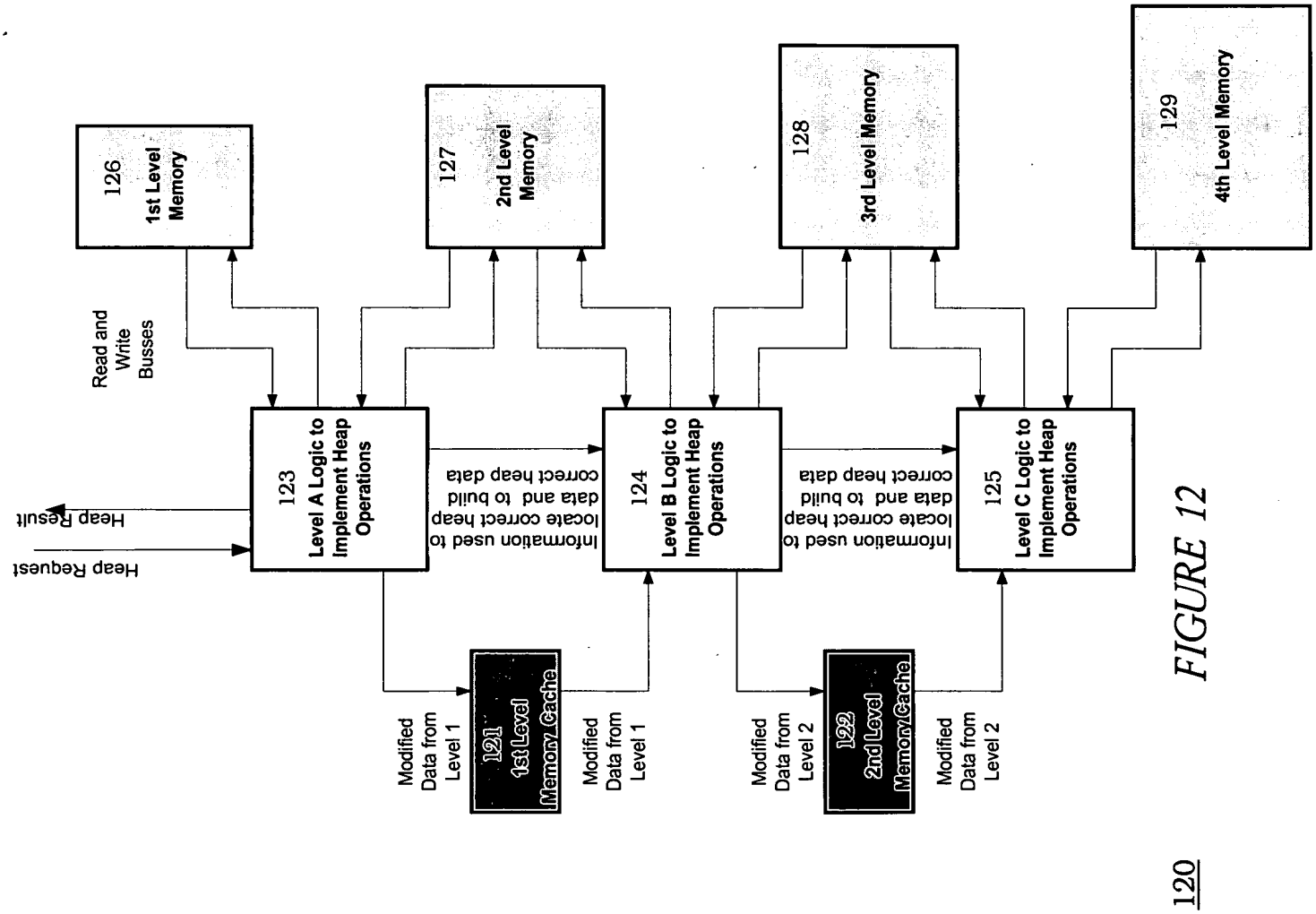
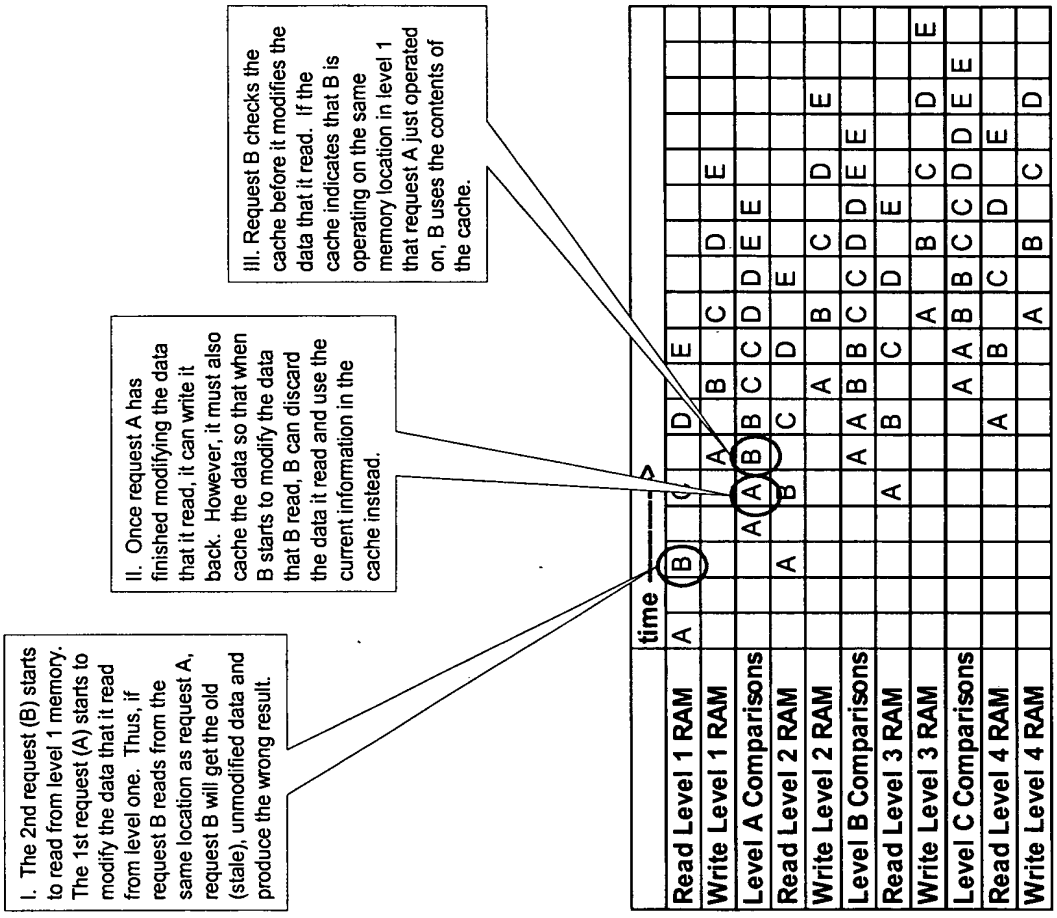


FIGURE 12

120



130

FIGURE 13